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Kramer Electronics, Ltd.

USER MANUAL

Models:

VS-61YC

6x1 s-Video Audio Matrix

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1 Introduction

Dedication by Kramer Electronics since 1981, to the development and manufacture of high quality video/audio equipment, makes the Kramer line an integral part of the finest production and presentation facilities in the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better! The Kramer line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to our high quality switchers and matrices, we also offer excellent distribution amplifiers, remote controllers, processors, interfaces and computer-related products. Congratulations on purchasing your Kramer **VS-61YC** *6x1 s-Video Audio Matrix*.

This product is ideal for the following typical applications:

- Video production studios and professional presentation systems
- Live broadcast, for switching between cameras in real-time
- CCTV and security applications

The package includes the following items:

- **VS-61YC** *6x1 s-Video Audio Matrix*
- Power cord
- Windows 95/98/NT/2000™ Kramer control software
- Null-modem adapter
- This user manual[1] and the Kramer concise product catalog/CD

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

3 Overview

The Kramer high performance **VS-61YC** *6x1 s-Video Audio Matrix* is a vertical interval matrix switcher for s-Video (Y/C) and balanced stereo audio

1 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com/manuals.html

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signals. You can route up to 6 sources to a monitor, VCR, or other receiving device.

In addition, the **VS-61YC**:

- Includes a separate Sync/Genlock input to lock its operation to a studio reference
- Includes a rear panel selector button to choose the reference sync - external sync input or input #1
- Has Video bandwidth that exceeds 250 MHz and audio bandwidth that exceeds 60 kHz, ensuring that it remains transparent even in the most critical production, presentation, or broadcast applications
- Produces glitch-free transitions, when sources share a common reference sync[1]

Control the **VS-61YC**:

- Using the front panel buttons
- Remotely, by RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- Via external dry-contact push buttons

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **VS-61YC** in a location free from moisture and away from excessive sunlight and dust

4 Your s-Video Audio Matrix

Figure 1 illustrates the front and rear panels of the **VS-61YC**. Table 1 and Table 2 define the front and rear panels of the **VS-61YC**, respectively.

1 As it switches during the vertical interval

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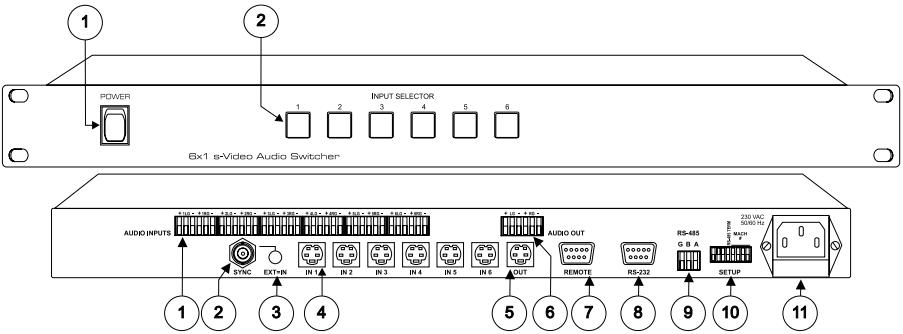

Figure 1: VS-61YC 6x1 s-Video Audio Matrix

Table 1: Front Panel VS-61YC 6x1 s-Video Audio Matrix Features

#	Feature	Function
1	*Power* Switch	Illuminated switch supplying power to the unit
2	*INPUT SELECTOR* Buttons	Select the input to switch to the output (from 1 to 6)

Table 2: Rear Panel VS-61YC 6x1 s-Video Audio Matrix Features

#	Feature	Function
1	*AUDIO INPUTS* Terminal Block Connectors	Connect to the balanced stereo audio sources (from 1 to 6)
2	SYNC BNC Connector	Connects to the external SYNC source
3	*EXT=IN* Sync Source Selector Button	Pushing in selects external sync[1], releasing selects the internal sync[2] source
4	*VIDEO IN* 4p Connectors	Connect to the s-Video sources (from 1 to 6)
5	*VIDEO OUT* 4p Connector	Connect to the s-Video acceptor
6	*AUDIO OUT* Terminal Block Connectors	Connect to the balanced stereo audio acceptor
7	*REMOTE* DB 9M Connector	Connects to dry contact switches
8	*RS-232* DB 9F Connector	Connects to the PC or other RS-232 Serial Controller
9	*RS-485* Terminal Block Connector	RS-485 port
10	*SETUP*	Dipswitches for setup
11	Power Connector	AC connector enabling power supply to the unit

5 Connecting the s-Video Audio Matrix Switcher

To connect the **VS-61YC**, connect the following[3] to the rear panel:

1. The s-Video sources and acceptors, as well as the appro priate audio sources and acceptors.
2. The power cord.

1 From the SYNC connector

2 From the IN 1 connector

3 Switch OFF the power on each device before connecting it to your VS-61YC switcher. After connecting your VS-61YC switcher, switch on its power and then switch on the power on each device

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In addition, you can choose to connect the following options:

- A PC (when using the *Kramer Control software*, for example*)* or other RS-232 (refer to section 5.1) or RS-485 controller (refer to section 5.2).
- A remote dry contact switch (refer to section 5.4)

5.1 Controlling via RS-232 (for example, using a PC)

To connect a PC to the **VS-61YC**, using the Null-modem adapter provided with the machine (recommended):

- Connect the RS-232 DB9 rear panel port on the **VS-61YC** to the Null-modem adapter and connect the Null-modem adapter with a 9 wire flat cable to the RS-232 DB9 port on your PC

To connect a PC to the **VS-61YC**, without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the **VS-61YC**, as Figure 2 illustrates (depending on whether the PC has a 9-pin or 25-pin connector)

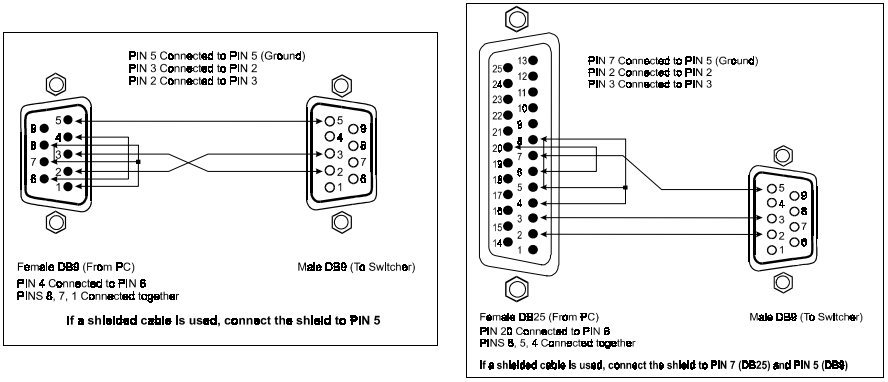
PIN 5 Connected to PIN 5 (Ground)
PIN 3 Connected to PIN 2
PIN 2 Connected to PIN 3
Female DB9 (From PC)
Male DB9 (To Switcher)
PIN 4 Connected to PIN 6
PINS 8, 7, 1 Connected together
If a shielded cable is used, connect the shield to PIN 5
PIN 7 Connected to PIN 5 (Ground)
PIN 2 Connected to PIN 2
PIN 3 Connected to PIN 3
Female DB25 (From PC)
Male DB9 (To Switcher)
PIN 20 Connected to PIN 6
PINS 8, 5, 4 Connected together
If a shielded cable is used, connect the shield to PIN 7 (DB25) and PIN 5 (DB9)

Figure 2: Connecting a PC without using a Null-modem Adapter

You can connect up to 16 **VS-61YC** units to the PC via the Null-modem adapter and the RS-232 port, and the RS-485 ports, as Figure 4 illustrates.

5.2 Controlling via RS-485

You can control a **VS-61YC** via an RS-485 controller, for example, a PC (equipped with an RS-485 interface) or a Master Programmable Remote Control system such as the Kramer **VS-3000**.

To connect a **VS-3000** to a **VS-61YC**

1. Connect the RS-485 terminal block port on the **VS-3000** to the RS-485 port on the **VS-61YC**, as follows:

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- Connect the "A" (+) PIN on the RS-485 rear panel port of the **VS-3000** to the "A" (+) PIN on the RS-485 rear panel port of the **VS-61YC**
- Connect the "B" (-) PIN on the RS-485 rear panel port of the **VS-3000** to the "B" (-) PIN on the RS-485 rear panel port of the **VS-61YC**
- If shielded twisted pair cable is used, the shield may be connected to the "G" (Ground) PIN on one of the units (for example, on the **VS-3000**)

2. Set the SETUP dipswitches on the **VS-61YC**, as follows:
   - Set DIPS 1, 2, 3, 5, 6, 7 and 8, OFF
   - Set DIP 4 ON

5.3 Setting the Dipswitches

Figure 3 illustrates the set of 8 dipswitches:

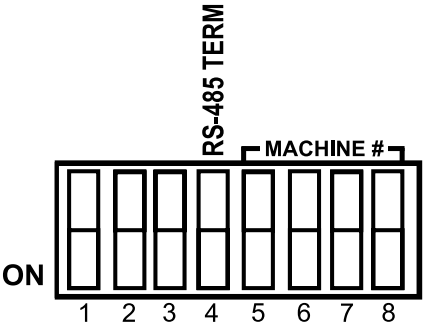

Figure 3: SETUP Set of 8 Dipswitches

Table 3: Dipswitch Settings

Function	DIPS	Description
MACHINE #	5, 6, 7, 8	Determines the position of a unit in the sequence (refer to section 5.3.1)
RS-485 TERM	4	Set ON to terminate the RS-485 line on the first and last cascaded units (refer to section 6.1)

5.3.1 Setting the MACHINE

The *MACHINE #* determines the position of a **VS-61YC** or a set of **VS-61YC** units in the sequence[1], specifying which **VS-61YC** is being controlled when several **VS-61YC** units connect to a PC or serial controller. Set the *MACHINE #* on a **VS-61YC** via DIPS 5, 6, 7 and 8, according to Table 4.

On a stand-alone **VS-61YC** unit (set as *MACHINE #* 1), set DIPS 1, 2, 3, 5, 6, 7, and 8 OFF, and DIP 4 ON.

1 Set the MACHINE # on the first unit to one, on the second unit to 2, on the t hird unit to 3

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When connecting more than one **VS-61YC**, set the first machine (the Master) that is closest to the PC, as *MACHINE* #1. The RS-232 connection to the PC is via this unit.

Table 4: Machine # Dipswitch Settings

MACHINE #	DIP 5	DIP 6	DIP 7	DIP 8
1 (Master)	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF
8	OFF	ON	ON	ON
9	ON	OFF	OFF	OFF
10	ON	OFF	OFF	ON
11	ON	OFF	ON	OFF
12	ON	OFF	ON	ON
13	ON	ON	OFF	OFF
14	ON	ON	OFF	ON
15	ON	ON	ON	OFF
16	ON	ON	ON	ON

5.4 Connecting the REMOTE Connector

By momentarily connecting a specific PIN to PIN 9, you can switch an input via a remote dry contact switch (and the appropriate front panel push button illuminates), as Table 5 specifies.

Table 5: Remote PIN # Settings

Attach PIN #:	To PIN 9, to switch INPUT #:
1	1
2	2
3	3
4	4
5	5
6	6

For example, to switch s-Video and balanced audio input # 5 to the s-Video and balanced audio output, touch PIN 5 to PIN 9, on the REMOTE connector.

6 Cascading the s-Video Audio Matrix Switcher

For certain applications, you may need more than just 6 inputs. Section 6.1 describes how to cascade up to 16 individual **VS-61YC** units (up to 96 inputs).

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6.1 Cascading Units via RS-232 and RS-485

To cascade up to 16 individual **VS-61YC** units, via RS-232 and RS-485, do the following:

1. Connect the s-Video sources and acceptors, as well as the appropriate balanced audio sources and acceptors, as section 5 describes.
2. Connect the RS-232 port on the first **VS-61YC** to the PC via the Null-modem adapter provided with the machine, as section 5.1 describes.
3. Connect the RS-485 terminal block port on the first **VS-61YC** to the RS-485 port on the second **VS-61YC** and so on, connecting all the RS-485 ports.
4. Set the SETUP dipswitches, as section 5.3 describes. In particular:

- Set the first **VS-61YC** as MACHINE # 1 and the following (up to 15) units as MACHINE # 2 to MACHINE # 16 respectively, according to Table 4
- Set Dip 4 ON on the first and last **VS-61YC** units (terminating the RS-485 line at 120 Ω). Set Dip 4 OFF on the other **VS-61YC** units
- Set Dip 1, Dip 2 and Dip 3 OFF on all **VS-61YC** units

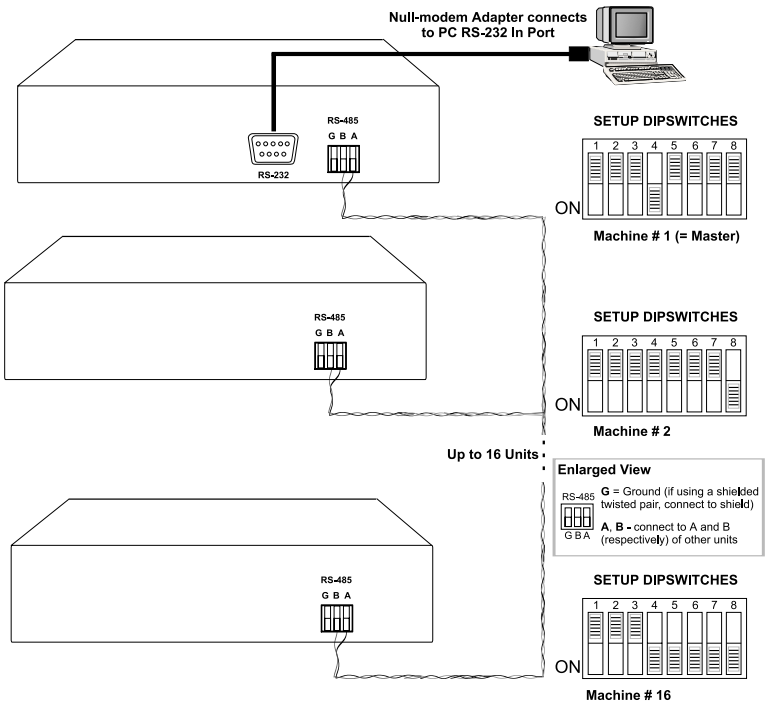

Figure 4: Cascading VS-61YC Units via RS-232 and RS-485

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7 Operating the s-Video Audio Matrix Switcher

Switching an input to the output automatically switches the balanced stereo audio signals with the s-Video signals (audio-follow-video). All operations and status indicators relate to both the s-Video and the balanced audio channels.

7.1 Operating via the Front Panel or Remote Control

You can operate your **VS-61YC** via:

- The front panel buttons—press one[1] of the 6 front panel push buttons—the push button illuminates and switches that input to the output
- Remotely, by RS-485 or RS-232 serial commands transmitted by a touch screen system, PC[2], or other serial controller
- Via external dry-contact push buttons (see section 5.4)

8 Technical Specifications

Table 6 includes the technical specifications[3]:

Table 6: Technical Specifications of the VS-61YC 6x1 s-Video Audio Matrix

INPUTS:	6 s-Video, 1 Vpp/75Ω (Y), 0.3Vpp/75Ω (C) on 4 pin connectors 6 balanced stereo audio, +4dBm/10kΩ on detachable terminal blocks	
OUTPUTS:	1 s-Video, 1 Vpp/75Ω (Y), 0.3Vpp/75Ω (C) on a 4 pin connector 1 balanced stereo audio, +4dBm/50Ω on a detachable terminal block	
MAX. OUTPUT LEVEL:	VIDEO: 3.8Vpp(Y)	AUDIO: 18 Vpp
BANDWIDTH (-3dB):	VIDEO: 250 MHz	AUDIO: 100 kHz
S/N RATIO:	VIDEO: 77.2dB	AUDIO: 87dB
CROSSTALK:	VIDEO: -62.8dB @ 5MHz	AUDIO: -81.6dB @ 1kHz
VIDEO COUPLING:	DC	
DIFF. GAIN:	<0.06%	
DIFF. PHASE:	<0.05 Deg	
K-FACTOR:	<0.05%	
AUDIO THD + NOISE:	0.091%	
AUDIO 2nd HARMONIC:	0.023%	
CONTROLS:	Manual, RS-232, RS-485	
POWER SOURCE:	230 VAC (115 VAC U.S.A.), 50/60 Hz 20 VA	
DIMENSIONS:	19-inch (W), 7-inch (D) 1U (H) rack-mountable	
WEIGHT:	2.7 kg (6 lbs.) approx.	
ACCESSORIES:	Power cord, Null modem adapter, Windows 95/98/NT/2000™ Kramer control software	

1 You can only press one push button at a time

2 For instructions on using the Windows 95/98/NT/2000™ Control Software, refer to the separate user manual (included on the CD-ROM in .pdf format), Kramer Control Software

3 Specifications are subject to change without n otice

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9 Table of Hex Codes for Serial Communication

Table 7 lists the Hex values for a single machine (*MACHINE* # 1):

Table 7: Hex Codes for VS-61YC Switching via RS-232/RS-485

IN 1	IN 2	IN 3	IN 4	IN 5	IN 6
01	01	01	01	01	01
81	82	83	84	85	86
81	81	81	81	81	81
81	81	81	81	81	81

10 Communication Protocol

The protocol that enables RS-232 communication between the **VS-61YC** unit and the PC uses 4 bytes of information. Data is at 9600 baud, no parity, 8 data bits and 1 stop bit. For RS-232, a null-modem connection between the machine and controller is used.

Table 8: Protocol Definitions

MSB							LSB
	DESTINATION	INSTRUCTION					
0	D	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0
1st byte							
	INPUT						
1	I6	I5	I4	I3	I2	I1	I0
7	6	5	4	3	2	1	0
2nd byte							
	OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0
7	6	5	4	3	2	1	0
3rd byte							
			MACHINE NUMBER				
1	X	X	M4	M3	M2	M1	M0
7	6	5	4	3	2	1	0
4th byte							

1st BYTE: Bit 7 – Defined as 0.

D – "DESTINATION": 0 - for sending information to the switchers (from the PC); 1 - for sending to the PC (from the switcher).

N5…N0 – "INSTRUCTION"

The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).

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2nd BYTE: Bit 7 – Defined as 1. I6…I0 – "INPUT".

When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number that is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER that was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1. O6…O0 – "OUTPUT".

When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number that is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER that was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1 Bit 6, bit 5 – Don't care

M4…M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number.

For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Note: All values in Table 9 are decimal, unless otherwise stated.

Table 9: Instruction Codes

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0, 18	RESET	0	0	1
1, 2	SWITCH	Set equal to input, which is to be switched (0 = disconnect)	1	2
5, 6	REQUEST STATUS OUTPUT	0	1	3
7	VIS	0	0 – No VIS (immediate) 1 – VIS switching	
10	REQUEST VIS SETTING	0	0	3, 4
12	REQUEST VIDEO / AUDIO TYPE SETTING	0	0 - for video 1 - for audio	3, 4
16	ERROR	0	1 - invalid instruction 2 - out of range	5
25	REQUEST GAIN	1, 126, 127	0 – video gain 1 - audio gain	4
57	SET AUTO-SAVE	0 - no save; 1 - auto-save	0	6
61	IDENTIFY MACHINE	1, 2 - Machine name 3, 4 - Internal software version	0	7
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs	1 - for video 2 - for audio	8

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NOTES on Table 9 (above):

NOTE 1 - When the master switcher is reset (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code:

01 85 81 83

was sent from the PC, then the switcher (machine 3) will switch input 5 to the output.

If the user switched input 1 to the output via the front panel keypad, then the switcher will send:

41 81 81 83

to the PC.

When the PC sends one of the commands in this group to the switcher , then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The reply to instruction 10 is as per the definitions in instruction 7. For example, if the present status of machine number 5 is input 3, then the reply to the HEX code:

05 80 81 85

would be:

45 80 83 85

NOTE 4 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code), or will not reply. If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1 (and its VIS setting cannot be programmed otherwise), the reply to the HEX code:

0A FE 80 81

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(ie. request VIS setting, with INPUT set as 126dec) would be:

4A FE 81 81

(ie. VIS setting = 1, which is defined as VIS from input #1).

NOTE 5 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to switch an input or output greater than the highest one defined). Reception of this code by the switcher is not valid.

NOTE 6 - Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note, that whenever the machine is turned on, the auto-save function is set.

NOTE 7 – This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1 or 2, the machine will send it s name. The reply is the decimal value of the INPUT and OUTPUT.

7D 80 BA 81

(i.e. 128dec+ 0dec for 2nd byte, and 128dec+ 61dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81

(i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

NOTE 8 – For example, the reply to the HEX code for defining the machine instruction for the number of inputs:

3E 81 81 81

would be:

7E 81 86 81

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LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The followin g are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   - ii) Product modification, or failure to follow instructions supplied with the product
   - iii) Repair or attempted repair by anyone not authorized by Kramer
   - iv) Any shipment of the product (claims must be presented to the carrier)
   - v) Removal or installation of the product
   - vi) Any other cause, which does not relate to a product defect
   - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: “Radio frequency devices Subpart B – Unintentional radiators”

CAUTION!

- ⌧ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ⌧ Use the supplied DC power supply to feed power to the machine.
- ⌧ Please use recommended interconnection cables to connect the machine to other components.

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im Vertrieb von CAMBOARD Electronics

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com. Updates to this user manual may be found at http://www.kramerelectronics.com/manuals.html. We welcome your questions, comments and feedback.

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